

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. – 43. (Canceled)

44. (Currently Amended) In a multicarrier modulation transceiver, a method of communicating diagnostic information over a communication channel using multicarrier modulation comprising:

transmitting or receiving at the multicarrier modulation transceiver an initiate diagnostic mode message; and

transmitting from the multicarrier modulation transceiver a diagnostic message using multicarrier modulation, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel and each bit in the diagnostic message is mapped to at least one DMT symbol, and wherein the diagnostic information about the communication channel one variable comprises an array representing is frequency domain received idle channel noise information.

45. (Currently Amended) A diagnostic system capable of communicating diagnostic information over a communication channel using multicarrier modulation comprising:

a transceiver capable of transmitting or receiving an initiate diagnostic mode message; and

a message determination module capable of determining and, in cooperation with the transceiver, transmitting a diagnostic message from the transceiver, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel and each bit in the diagnostic message is mapped to at least one DMT signal, and wherein one variable comprises an array representing the diagnostic information about the communication channel is frequency domain received idle channel noise information.

46. (Currently Amended) A multicarrier communication transceiver capable of communicating diagnostic information over a communication channel using multicarrier modulation comprising:

means for transmitting or receiving at the multicarrier communication transceiver an initiate diagnostic mode message; and

means for transmitting from the multicarrier communication transceiver a diagnostic message using multicarrier modulation, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel and each bit in the diagnostic message is mapped to at least one DMT symbol, and wherein ~~the diagnostic information about the communication channel is one variable~~ comprises an array representing frequency domain received idle channel noise information.

47. (Currently Amended) In a multicarrier communication transceiver, a protocol for communicating diagnostic information over a communication channel using multicarrier modulation comprising:

transmitting or receiving at the multicarrier communication transceiver an initiate diagnostic mode message; and

transmitting from the multicarrier communication transceiver a diagnostic message using multicarrier modulation, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel and each bit in the diagnostic message is mapped to at least one DMT symbol, and wherein ~~the diagnostic information about the communication channel is one variable~~ comprises an array representing frequency domain received idle channel noise information.

48. (Currently Amended) An information storage media comprising instructions that when executed communicate diagnostic information over a communication channel using multicarrier modulation comprising:

instructions that when executed direct a transceiver to receive or transmit an initiate diagnostic mode message; and

instructions that when executed transmit a diagnostic message from the transceiver using multicarrier modulation, wherein the diagnostic message comprises a

plurality of data variables representing the diagnostic information about the communication channel and each bit in the diagnostic message is mapped to at least one DMT symbol, and wherein the diagnostic information about the communication channel is one variable comprises an array representing frequency domain received idle channel noise information.

49. (Currently Amended) In a multicarrier modulation transceiver, a method of communicating diagnostic information over a communication channel using multicarrier modulation comprising:

transmitting or receiving at the multicarrier modulation transceiver an initiate diagnostic mode message; and

transmitting from the multicarrier modulation transceiver a diagnostic message using multicarrier modulation with DMT symbols that are mapped to one bit of the diagnostic message, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel, and wherein the diagnostic information about the communication channel is one variable comprises an array representing frequency domain received idle channel noise information.

50. (Currently Amended) A diagnostic system capable of communicating diagnostic information over a communication channel using multicarrier modulation comprising:

a transceiver capable of transmitting or receiving an initiate diagnostic mode message; and

a message determination module capable of determining and, in cooperation with the transceiver, transmitting from the transceiver a diagnostic message using multicarrier modulation with DMT symbols that are mapped to one bit of the diagnostic message, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel, and wherein the diagnostic information about the communication channel is one variable comprises an array representing frequency domain received idle channel noise information.

51. (Currently Amended) A multicarrier communication transceiver capable of communicating diagnostic information over a communication channel using multicarrier modulation comprising:

means for transmitting or receiving at the multicarrier communication transceiver an initiate diagnostic mode message; and

means for transmitting from the multicarrier communication transceiver a diagnostic message using multicarrier modulation with DMT symbols that are mapped to one bit of the diagnostic message, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel, and wherein ~~the diagnostic information about the communication channel is one variable~~ comprises an array representing frequency domain received idle channel noise information.

52. (Currently Amended) In a multicarrier communication transceiver, a protocol for communicating diagnostic information over a communication channel using multicarrier modulation comprising:

transmitting or receiving at the multicarrier communication transceiver an initiate diagnostic mode message; and

transmitting from the multicarrier communication transceiver a diagnostic message using multicarrier modulation with DMT symbols that are mapped to one bit of the diagnostic message, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel, and wherein ~~the diagnostic information about the communication channel is one variable~~ comprises an array representing frequency domain received idle channel noise information.

53. (Currently Amended) An information storage media comprising instructions that when executed communicate diagnostic information over a communication channel using multicarrier modulation comprising:

instructions that when executed direct a transceiver to receive or transmit an initiate diagnostic mode message; and

instructions that when executed transmit from the transceiver a diagnostic message using multicarrier modulation with DMT symbols that are mapped to one bit of

the diagnostic message, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel, and wherein the diagnostic information about the communication channel one variable comprises an array representing is frequency domain received idle channel noise information.

54. (Previously Presented) The method of claim 44, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

55. (Previously Presented) The system of claim 45, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

56. (Previously Presented) The transceiver of claim 46, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

57. (Previously Presented) The protocol of claim 47, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

58. (Previously Presented) The media of claim 48, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

59. (Previously Presented) The method of claim 49, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

60. (Previously Presented) The system of claim 50, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

61. (Previously Presented) The transceiver of claim 51, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

62. (Previously Presented) The protocol of claim 52, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

63. (Previously Presented) The media of claim 53, wherein the initiate diagnostic mode message is based on at least one of an initialization failure, a bit rate failure, a CRC error in an initialization message, a CRC error during the normal steady state transmission mode, a forward error correction error, a user request and a CO technician request.

64. (Previously Presented) The method of claim 44, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

65. (Previously Presented) The system of claim 45, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

66. (Previously Presented) The transceiver of claim 46, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

67. (Previously Presented) The protocol of claim 47, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

68. (Previously Presented) The media of claim 48, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

69. (Previously Presented) The method of claim 49, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

70. (Previously Presented) The system of claim 50, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

71. (Previously Presented) The transceiver of claim 51, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

72. (Previously Presented) The protocol of claim 52, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

73. (Previously Presented) The media of claim 53, wherein the diagnostic message comprises diagnostic information about the communication channel including at least one of a length of the diagnostic information, a time domain received reverb signal, a frequency domain reverb signal, an amplifier setting, a CO transmitter power spectral density, a frequency domain received idle channel, a signal to noise ratio, bits and gain information, and upstream and or downstream transmission rates.

74. (Previously Presented) The method of claim 44, wherein the transceiver is a central office modem or a remote terminal modem.

75. (Previously Presented) The system of claim 45, wherein the transceiver is a central office modem or a remote terminal modem.

76. (Previously Presented) The transceiver of claim 46, wherein the transceiver is a central office modem or a remote terminal modem.



77. (Previously Presented) The protocol of claim 47, wherein the transceiver is a central office modem or a remote terminal modem.

78. (Previously Presented) The method of claim 49, wherein the transceiver is a central office modem or a remote terminal modem.

79. (Previously Presented) The system of claim 50, wherein the transceiver is a central office modem or a remote terminal modem.

80. (Previously Presented) The transceiver of claim 51, wherein the transceiver is a central office modem or a remote terminal modem.

81. (Previously Presented) The protocol of claim 52, wherein the transceiver is a central office modem or a remote terminal modem.

82. (Currently Amended) In a multicarrier modulation transceiver, a method of communicating diagnostic information including a plurality of data variables over a communication channel using multicarrier modulation comprising:

associating, in a diagnostic message and based on an initiate diagnostic mode message, each bit in the diagnostic message with at least one DMT symbol, ~~wherein the diagnostic information about the communication channel is one variable~~ comprises an array representing frequency domain received idle channel noise information.

83. (Currently Amended) In a multicarrier modulation transceiver, a method of communicating diagnostic information over a communication channel using multicarrier modulation comprising:

transmitting, during a diagnostic mode, a diagnostic message using multicarrier modulation, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel and at least one bit in the diagnostic message is mapped to at least one DMT symbol, ~~wherein the diagnostic information about the communication channel is one variable~~ comprises an array representing frequency domain received idle channel noise information.

84. (Canceled)

85. (Previously Presented) Communicating diagnostic information over a communication channel using multicarrier modulation comprising:

communicating from a transceiver a diagnostic message comprising a plurality of data variables representing the diagnostic information, wherein each bit in the diagnostic message is mapped to at least one DMT symbol, wherein ~~the diagnostic information about the communication channel is~~ one variable comprises an array representing frequency domain received idle channel noise information.